

Remark

Applicants respectfully request reconsideration of this application as amended. Claims 1, 2, 14, 21, 26, 27 and 33 have been amended. No claims have been canceled. Claims 37 and 38 have been added as New. Therefore, claims 1-38 are now presented for examination.

35 U.S.C. § 103 Rejection*Tsatsanis and Henderson*

Claims 1-7, 10-17, 20-26 and 35-36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Tsatsanis, U.S. Patent Publication No. 2006/0056522 ("Tsatsanis") in view of Henderson et al., U.S. Patent No. 6,678,375 ("Henderson"). Tsatsanis is cited to show vectoring while Henderson is cited to show sending multiple signals with a common reference wire.

Tsatsanis takes the approach of using each twisted pair as a separate transmission line and vectoring is done independently for each pair. This is done to mitigate the near and far end cross talk (NEXT, FEXT) between the two wires of each pair.

Henderson breaks up the pairs to get more transmission lines. This loses the benefits of the twisted pairs. One disadvantage is that NEXT and FEXT between the pairs is greatly increased. Another disadvantage is that each twisted pair is designed to have about the same impedance as each other twisted pair. Splitting the pairs renders the impedance between each line and the common reference line inconsistent. Henderson does nothing to address these two issues.

Referring e.g. to Claim 1, there is "vectoring upstream and downstream transmissions with the plurality of CPEs across all active channels of the segment."

Support for such an amendment is provided, for example, at paragraph 38, "connections between pedestals can be converted to 'supervectorized' segments... coordinating, for example, 8-20 loops to carry several Gbps."

At paragraph 48, this "one-sided structure is preferable to the two-sided 'vector-coding' special case in many situations because that equivalent-performing structure also requires coordination at the transmit side. For example, using the two-sided vector-coding may be physically impossible where upstream transmissions originate from multiple CPEs using multiple loop segments of the present inventions that terminate in the same pedestal. FEXT from these customers into one another in such a situation can be eliminated via the structure of FIG. 5."

At paragraph 54, for "the one-sided case, a special precoded downstream transmitter can be used to remove FEXT between CPEs that are in different places but terminate on the same pedestal."

This clarification of the vectoring in Claim 1 has several elements. First, there is a plurality of CPEs at the end of the multiple loop segment.

Second, the vectoring is across all active channels. The references do not show such a thing, but instead independent vectoring of each line. In addition, being across all active channels, the vectoring is across channels that are connected to different CPEs. The reference also does not show this.

Third, the vectoring is both upstream and downstream vectoring from the end of the segment opposite the CPEs. This enables the significant benefit that vectoring can occur across channels that are coupled to different CPEs. If the vectoring is from the CPEs, each CPE has no knowledge of any other CPE, making it nearly impossible for any one CPE to vector the signals taking other CPEs into consideration. At the end

opposite the CPEs, however, the vectoring can take all of the active CPEs into consideration. The specification refers to this as one-sided vectoring. Tsatsanis uses two-sided vectoring. One-sided vectoring can, of course, still be combined with some less effective vectoring at the CPE end.

The impedance issue mentioned above is addressed, for example, by the innovations recited in Claims 10 and 37. The simple resistor scenario shown in the references will not adequately balance reflections when the twisted pairs are split.

These significant innovations over the cited combination allows cross talk to be substantially reduced rendering the system commercially viable for simultaneous use of all of the channels. All of the claims contain either expressly or by incorporation, features similar to those discussed above. Accordingly, the claims of the present application are believed to be allowable over the art of record.

35 U.S.C. § 103 Rejection

Tsatsanis, Henderson and Kerpez

Claims 8-9, 18-19 and 32-34 are rejected under 35 U.S.C. §103(a) as being unpatentable over Tsatsanis, Henderson and Kerpez, U.S. Patent No. 7,106,833 ("Kerpez"). Kerpez does not show and is not cited for the features absent from the two primary references and, accordingly, this rejection is also traversed.

Conclusion

Applicants respectfully submit that the rejections have been overcome by the amendment and remark, and that the claims as amended are now in condition for allowance. Accordingly, Applicants respectfully request the rejections be withdrawn and the claims as amended be allowed.

Invitation for a Telephone Interview

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

Request for an Extension of Time

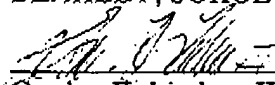
Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,
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Date: 5/13/8


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